

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A method ~~for monitoring the quality of a photonic crystal fiber,~~
~~the method~~ comprising:

directing test light toward a side of a photonic crystal fiber, wherein the test light is
related to a estimated bandgap of the photonic crystal fiber;

detecting measurement light emerging from the photonic crystal fiber in response to the
test light; and

~~monitoring the quality of the photonic crystal fiber~~ determining a deviation between an
actual bandgap of the photonic crystal fiber and the estimated bandgap based on the
measurement light.

2. (Original) The method of claim 1, wherein the emerging light comprises reflected
light.

3. (Currently Amended) The method of claim 1, wherein ~~monitoring the quality of the~~
~~photonic crystal fiber~~ determining the deviation comprises determining a measurement spectrum
of the measurement light.

4. (Canceled)

5. (Currently Amended) The method of claim 3, wherein ~~monitoring the quality of the photonic crystal fiber~~ determining the deviation further comprises determining an error signal that is based on a function of the measurement spectrum.

6. (Original) The method of claim 5, wherein the function of the measurement spectrum is also a function of a reference spectrum.

7. (Currently Amended) The method of claim 6, wherein the reference spectrum is related to the estimated bandgap ~~an empirically determined reference spectrum~~.

8. (Currently Amended) The method of claim 6, wherein the reference spectrum is a theoretically determined or empirically determined reference spectrum.

9. (Original) The method of claim 6, wherein the function is related to a difference between the measurement spectrum and the reference spectrum.

10. (Original) The method of claim 6, wherein the function is related to a weighted difference between the measurement spectrum and the reference spectrum.

11. (Original) The method of claim 1, further comprising drawing a photonic crystal fiber preform into the photonic crystal fiber while the measurement light is detected.

12. (Currently Amended) The method of claim 11, further comprising adjusting draw parameters based on the ~~photonic crystal fiber quality~~ determined deviation.

13. (Original) The method of claim 1, wherein the photonic crystal fiber is a Bragg fiber.

14. (Original) The method of claim 1, wherein the photonic crystal fiber is designed to guide light having a wavelength between 1.2 microns and 1.7 microns.

15. (Original) The method of claim 1, wherein the photonic crystal fiber is designed to guide light having a wavelength between 0.7 microns and 1.0 microns.

16. (Original) The method of claim 1, wherein measurement light is detected over a range of angles.

17. (Original) The method of claim 1, wherein the detection of measurement light comprises collecting the measurement light with light collecting optics.

18. (Currently Amended) The method of claim 1, wherein ~~monitoring the quality of the photonic crystal fiber comprises detecting~~ the deviation is related to structural defects in the photonic crystal fiber.

19. (Canceled) .

20. (Currently Amended) The method of claim 1, wherein ~~monitoring the quality of the photonic crystal fiber comprises detecting~~ the deviation is related to compositional defects in the photonic crystal fiber.

21. (Canceled)

22. (Currently Amended) The method of claim 1, wherein ~~monitoring the quality of the photonic crystal fiber~~ determining the deviation comprises detecting a differences between a measurement spectrum ~~based on~~ related to the measurement light and a reference spectrum.

23. (Original) The method of claim 1, wherein directing the test light comprises directing the test light to different regions of the photonic crystal fiber.

24. (Original) The method of claim 1, wherein directing the test light comprises simultaneously directing test light to the different regions of the photonic crystal fiber.

25. (Original) The method of claim 24, wherein detecting the measurement light comprises detecting the measurement light emerging from the regions of the photonic crystal fiber.

26. (Currently Amended) The method of claim 25, wherein ~~monitoring the quality of the photonic crystal fiber~~ determining the deviation comprises determining a measurement spectrum of each region of the photonic crystal fiber based on the measurement light.

27. (Original) The method of claim 1, wherein directing the test light includes focusing the test light onto the side of the photonic crystal fiber.

28. (Original) The method of claim 27, wherein detecting the measurement light includes gathering the measurement light scattered from the side of the photonic crystal fiber.

29. (Original) The method of claim 28, wherein a single optical component performs the focusing and gathering.

30. (Currently Amended) A method ~~for monitoring the quality of an optical waveguide, the method comprising:~~

directing broadband test light to a side of ~~an~~ a photonic crystal optical waveguide;
detecting measurement light reflected from the photonic crystal optical waveguide in response to the test light;

determining a measurement spectrum from the measurement light intensity at a plurality of wavelengths related to a bandgap of the photonic crystal waveguide; and
monitoring optical properties ~~the quality~~ of the photonic crystal optical waveguide based on a measurement spectrum of the measurement light.

31. (Currently Amended) The method of claim 30, wherein monitoring the optical properties ~~quality~~ of the photonic crystal optical waveguide comprises comparing the measurement spectrum to a reference spectrum.

32. (Currently Amended) The method of claim 30, wherein monitoring the optical properties ~~quality~~ of the photonic crystal optical waveguide comprises detecting structural defects in the photonic crystal optical waveguide ~~fiber~~.

33. (Currently Amended) The method of claim 32, wherein forming the photonic crystal optical waveguide comprises ~~further comprising~~ drawing an optical waveguide preform into the photonic crystal optical waveguide, ~~wherein detecting the measurement light occurs during the drawing~~.

34. (Currently Amended) The method of claim 33, further comprising adjusting a draw parameter for the drawing based on the photonic crystal optical waveguide quality.

35. (Currently Amended) The method of claim 30, wherein monitoring the optical properties ~~quality~~ of the photonic crystal optical waveguide comprises detecting compositional defects in the photonic crystal optical waveguide [~~fiber~~].

36. (Canceled)

37. (Canceled)

38. (Currently Amended) The method of claim 30, wherein the photonic crystal optical waveguide is a photonic crystal fiber

39. (Original) The method of claim 38, wherein the photonic crystal fiber is a Bragg fiber.

40. (Currently Amended) An apparatus for monitoring a photonic crystal fiber, the apparatus comprising:

a mount for supporting the photonic crystal fiber;
an illumination system which during operation directs test light to a side of the photonic crystal fiber, wherein the test light is related to a estimated bandgap of the photonic crystal fiber;
and

a detection system which during operation detects measurement light emerging from the photonic crystal fiber in response to the test light; and

a controller which during operation causes the illumination system to direct the test light, receives information based on the measurement light detected by the detection system, and determines a deviation between an actual bandgap for the photonic crystal fiber and the estimated bandgap based on the information.

41. (Canceled)

42. (Currently Amended) The apparatus of claim ~~40~~41, wherein during operation the controller determines a measurement light spectrum from the information.

43. (Canceled)

44. (Currently Amended) The apparatus of claim ~~40~~ 43, further comprising a fiber drawing system which during operation draws a photonic crystal fiber preform into the photonic crystal fiber.

45. (Currently Amended) The apparatus of claim 44, wherein during operation the controller adjusts a draw parameter of the fiber drawing system based on the deviation measurement light spectrum.

46. (Currently Amended) The apparatus of claim ~~43~~ 42, wherein ~~during operation the controller detects~~ further comprising identifying compositional defects or structural defects in the photonic crystal fiber based on the deviation measurement light spectrum.

47. (Original) The apparatus of claim 46, further comprising a fiber drawing system which during operation draws a photonic crystal fiber preform into the photonic crystal fiber.

48. (Currently Amended) The apparatus of claim 47, wherein during operation the controller adjusts a draw parameter of the fiber drawing system based on the deviation measurement light spectrum.

49. (New) A method for monitoring a photonic crystal fiber, the method comprising:
directing test light toward a side of the photonic crystal fiber while drawing the photonic crystal fiber from a photonic crystal fiber preform;
detecting measurement light emerging from the photonic crystal fiber in response to the test light; and
monitoring optical properties of the photonic crystal fiber based on a estimated bandgap of the photonic crystal fiber and the measurement light.

50. (New) The method of claim 49, wherein monitoring optical properties of the photonic crystal fiber comprises detecting defects in the photonic crystal fiber.

51. (New) The method of claim 49, wherein the test light is related to the estimated bandgap and the optical properties are monitored based on a deviation of an actual bandgap determined from the measurement light and the estimated bandgap.

52. (New) A method comprising:
directing test light towards a side of a photonic crystal fiber, wherein the test light is related to a estimated bandgap of the photonic crystal fiber;
detecting measurement light emerging from the photonic crystal fiber in response to the test light; and
identifying a defect in the photonic crystal fiber based on the measurement light, wherein the defect causes a deviation between an actual bandgap for the photonic and the estimated bandgap.

53. (New) The method of claim 52, wherein the photonic crystal fiber comprises a confinement region forming a two-dimensional photonic crystal.

54. (New) The method of claim 52, wherein the photonic crystal fiber is a Bragg fiber.

55. (New) The method of claim 1, wherein the photonic crystal fiber comprises a confinement region forming a two-dimensional photonic crystal.